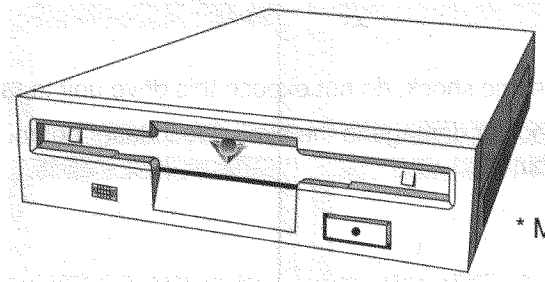
SUPERDISK DRIVE UNIT
LKM-F933-1 / LKM-F934-1
INSTRUCTION MANUAL

Please read through these instructions before operating the unit.
Interface : ATAPI



* Model LKM-F934-1

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IMPORTANT SAFETY NOTICE

NOTICE

(1) You may not reproduce or transcribe any part of this publication without permission.

(2) We reserve the right to revise this document at any time without notice.

(3) If you have any questions about contents of this document, contact your sales representative.

SAFETY NOTICE

(1) To prevent fire or electric shock, do not expose this drive unit to rain or moisture.

(2) To avoid electric shock or damage to the eyes due to laser beam, do not attempt to disassemble the cabinet.

This equipment is certified to conform to EN60950, EN60825.
In case this equipment should be run as an internal drive, the PC-System has to operate according to the relevant regulations.

LASER SAFETY INFORMATION

Class 1 LASER Product

This equipment is certified to comply with DHHS Rule 21 CFR Chapter 1, Subchapter J in effect as of date of manufacture.

Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN60825 for Class 1 laser products.

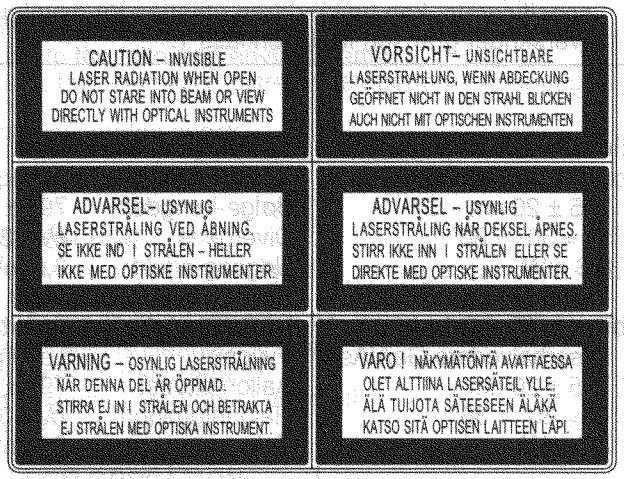
Class 1 laser products are not considered to be hazardous. To ensure continued product safety, the following precautions should be heeded.

Caution :

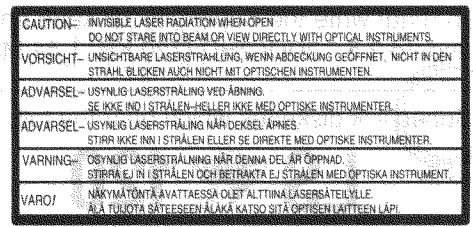
(1) The use of controls or adjustments or procedures other than those specified herein may result in hazardous radiation exposure.

(2) The drive is designed to be incorporated into a computer-based system or unit which has an enclosing cover. The drive may not be used as a stand-alone unit.

(3) Do not open the drive unit; no user adjustable or serviceable parts are inside.


CAUTION – INVISIBLE LASER RADIATION WHEN OPEN DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
VORSICHT– UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET NICHT IN DEN STRAHL BLICKEN AUCH NICHT MIT OPTISCHEN INSTRUMENTEN
ADVARSEL– USYNLIG LASERSTRÅLING VED ÅBNING. SE IKKE IND I STRÅLEN – HELLER IKKE MED OPTISKE INSTRUMENTER.
ADVARSEL – USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES. STIRR IKKE INN I STRÅLEN ELLER SE DIREKTE MED OPTISKE INSTRUMENTER.
VARNING – OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. STIRRA EJ IN I STRÅLEN OCH BETRAKTA EJ STRÅLEN MED OPTISKA INSTRUMENT.
VARO ! NÄKYMÄTÖNTÄ AVATTAESSA OLET ALTTIINA LASERSÄTEILYLLE. ÄLÄ TUIJOTA SÄTEESEEN ÄLÄKÄ KATSO SITÄ OPTISEN LAITTEEN LÄPI.

- This label is attached to the upper shield at the top of the drive unit.
- Märkningen återfinns på den översta kåpan överst på drivenheten. (For Sweden)
- Denne merkelappen er festet til det øverste dekselet på toppen av spilleren. (For Norway)
- Denne etiket er sat fast på den øverste skærm på drev-enhedens top. (For Denmark)
- Tämä etiketti on liimattu voimayksikön yläosan suojalevyyn. (For Finland)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- This label is attached to the bottom of the drive unit.
- Märkningen återfinns på drivenhetens undersida. (For Sweden)
- Denne merkelappen er festet til undersiden av spilleren. (For Norway)
- Denne etiket er sat fast i bunden af drev-enheden. (For Denmark)
- Tämä etiketti on liimattu laitteen pohjaan. (For Finland)

For Finland

VAROITUS! Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.

For Sweden

VARNING! Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.

LASER Specification

Type:	Semiconductor laser GaAlAs
Wave Length:	795 ± 20 nm
Divergence:	$\theta_V = 30° \sim 36°$
Output Power:	3.6 mW

Laser- specifikationer: (For Sweden)

Typ:	Laserhalvedare GaAlAs
Våglängd:	795 ± 20 nm
Divergens:	$\theta_V = 30° \sim 36°$
Uteffekt:	3,6 mW

LASER Spesifikasjon: (For Norway)

Type:	Halvleder laser GaAlAs
Bølgelengde:	795 ± 20 nm
Divergens:	$\theta_V = 30° \sim 36°$
Utgangseffekt:	3,6 mW

Laser Specifikationer: (For Denmark)

Type:	Semiconductor GaAlAs
Bølge-længde:	795 ± 20 nm
Divergens:	$\theta_V = 30° \sim 36°$
Udgang-effekt:	3,6 mW

LASERin tekniset tiedot: (For Finland)

Tyyppi:	Laserpuolijohdin GaAlAs
Aallon pituus:	795 ± 20 nm
Hajaantuminen:	$\theta_V = 30° \sim 36°$
Teho:	3,6 mW

INTRODUCTION

SuperDisk diskette can store high capacity data (up to 83 disks of the standard FD).
This SuperDisk drive can read/ write the SuperDisk diskette and provides a full read/ write compatibility with the standard 3.5 " 2DD/ 2HD (720 KB/ 1.44 MB).

This drive unit uses SuperDisk diskettes which bear the following mark.

LS 120™

This mark is a trademark of Imation Corporation.

System Requirements

- Computer
  - IBM PC-AT or Compatible
- Operating System
  - MS Windows 98
  - MS Windows 95 4.00 950/ 950a/ 950b
  - MS Windows NT4.0 / NT3.51
  - PC-DOS Ver. 5.0 or later
  - MS-DOS Ver. 5.0 or later
  - MS Windows 3.1

CHAPTER 1 PRECAUTIONS WHEN OPERATING

1.1 PRECAUTIONS WHEN TRANSPORTING

To avoid damages
* Keep the original packing materials for the drive unit.
* Prior to sending the drive unit, remove the disk from drive unit and repack drive unit as it was originally packed.

1.2 INSTALLATION LOCATION

Do not expose unit to the following environments.
* High-temperature, high-humidity, extreme temperature changes.
* Dusty
* Excessive vibration/ sudden shock.
* Inclined place.
* Direct sunlight.

1.3 PRECAUTIONS FOR USE

* Never push or insert objects of any kind through the disk slot, never spill liquid of any kind on the unit.
* Never use the Magnetic head cleaning kit. If you use it, it may shave the head. The SuperDisk drive's head is cleaned by itself.
* Do not place objects on the product.
* Do not attempt to repair this product yourself.
* Do not open or remove covers.

1.4 PRECAUTIONS FOR OPERATION

To avoid data read/ write error
* Do not move the drive unit during operation.
* Do not operate the unit immediately after a sudden increase in temperature.
* Maximum Tilt angle of 15 degrees, either horizontal or vertical installation is allowed.

1.5 PRECAUTIONS WHEN HANDLING DISKS

① Do not finger the magnetic disk through the shutter.

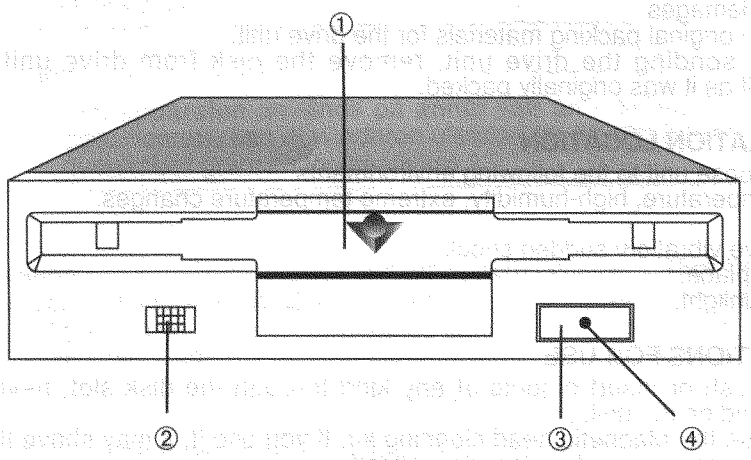
② While not using, ensure the disk shutter is tightly closed to protect the magnetic surface.

③ Keep away any magnetic instrument from a disk.

④ Store a disk in the specified environment:
Temperature: 4 to 60 °C
Relative humidity: 8 to 90 %
Max. wet bulb temp. is 29 °C
No moisture condensation

CHAPTER 2 PARTS AND FUNCTIONS

2.1 FRONT VIEW



① DISK SLOT

Insert a disk.

② BUSY INDICATOR

Lights while a command from host is executed. (including read/ write operations)

③ EJECT BUTTON

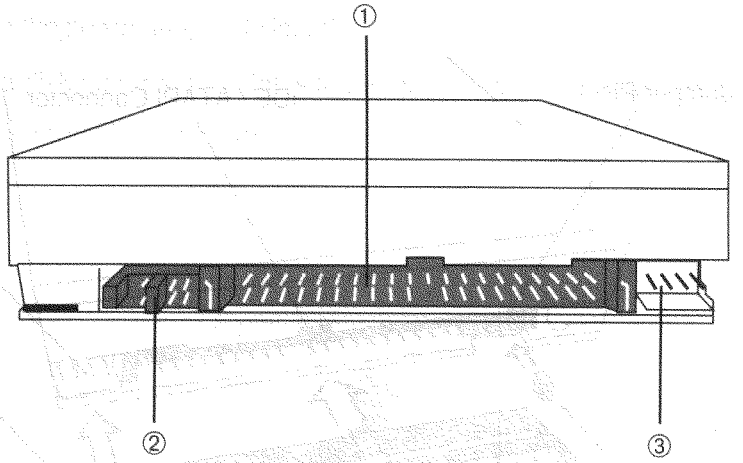
Ejects a disk.

④ EMERGENCY EJECT HOLE

Insert an instrument such as straightened paper clip pin into this hole to manually eject a disk. (See 4.1)

Note: The front panel is none with Model LKM-F933-1.

2.2 REAR VIEW



① IDE / ATAPI CONNECTOR

Connects to host computer's interface connector.

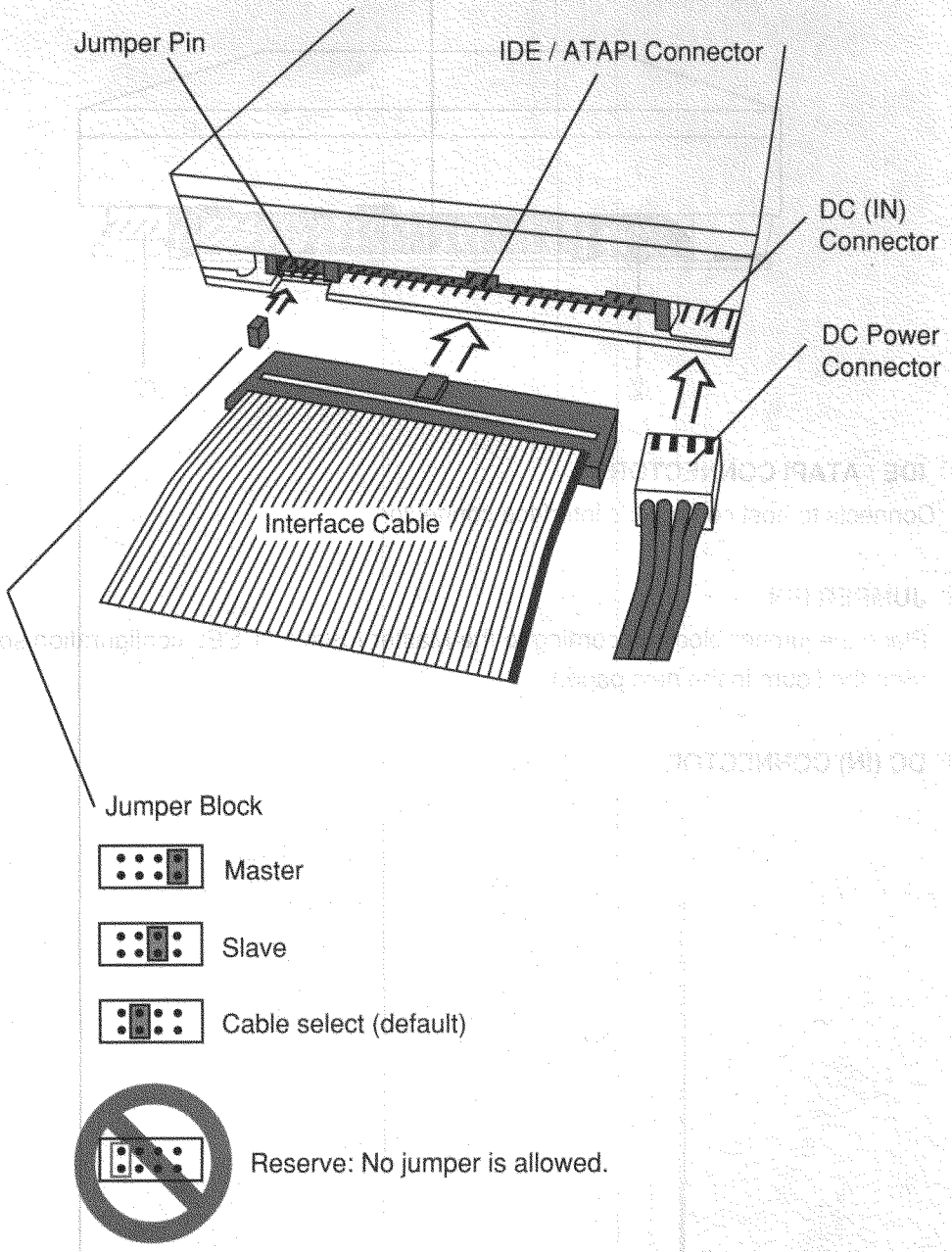
② JUMPER PIN

Place the jumper block according to the Master / Slave / CSEL configuration selected. (See the figure in the next page.)

③ DC (IN) CONNECTOR

CHAPTER 3 CONNECTIONS

3.1 CONNECTING VIEW



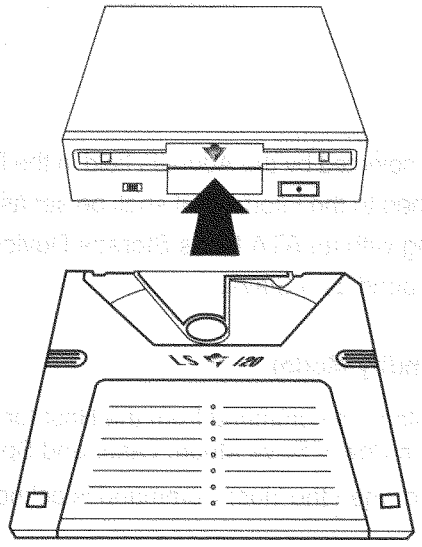
CHAPTER 4 GUIDE TO OPERATION

4.1 INSTALLATIONS

- To start operation on drive.

  ① Turn on the power supply of Host PC.

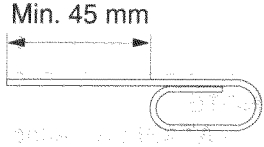
  ② Insert a disk into the disk slot with the disk's label facing up and the shutter side heading as shown in the figure below.



CAUTION:

- Do not insert any foreign objects into the disk slot. This could result in a malfunction.
- Do not press down hard on a disk when inserting the disk, because this may cause damages or malfunction to the disk and/or the drive unit.

- In case of emergency, eject the disk manually
  If for some reason the disk does not eject automatically, press the eject-bar (for example, insert a straightened paper clip pin with minimum straight length = 45 mm, Diameter = 1~ 1.5 mm) into the emergency eject hole to eject the disk. (Before proceeding with this emergency step, make sure that the power is switched OFF.)



CHAPTER 5 GENERAL DESCRIPTION

5.1 SUMMARY OF FEATURES

① High Data Storage Capacity (with SuperDisk disk)
② Full read/ write compatibility with the standard 2DD/ 2HD (720 KB/ 1.44 MB)
③ Embedded ATAPI Interface
④ 1 inch Height Design
⑤ Either Horizontal or Vertical Installation is available.
⑥ 2x Speed (than the old version model)

5.2 SYSTEM SET UP

The ATAPI Devices are selected by the Address field in the Drive Select Register. When a single Device is attached to the interface, it shall be set as Device 0. When the ATAPI Device is attached along with an ATA Mass Storage Device, the ATAPI Device will be set as Device 1 and respond as a Slave.

5.3 POWER SAVING (Standby Mode)

① When the drive waits for a command from the Host for more than four seconds, then the drive enters Power Save Mode. Laser and Spindle motor stop.

② Restart is automatic when the Host Command is acknowledged.

NOTE :

- **ATAPI :** AT Attachment Packet Interface.
- **MS Windows** is a registered trademark of Microsoft Corporation.
- **IBM PC-AT** is a registered trademark of International Business Machines Corporation.
- **SuperDisk** is a trademark of Imation Corporation.

CHAPTER 6 SPECIFICATION SUMMARY

6.1 PERFORMANCE

① Disk Diameter		3.5 inches	
② Disk speed		1440 r/min	
③ Storage Capacity			
Unformatted	150 MBytes (SuperDisk)	1/ 2 MBytes (2DD/ 2HD)	
Formatted	120 MBytes (SuperDisk)	720 KB/1.44 MBytes(2DD/ 2HD)	
④ Recording Density		33.8 k FCI	
⑤ Track Density		2490 TPI	
⑥ Data Transfer Rate from Disk		750 ~ 1360 KBytes/ s	
⑦ Seek Time (average)		70 ms typical	
MTBF		15,000 POH (@duty 25 %)	

6.2 ERROR RATES

• Hard read errors	Less than 10^{-12}

6.3 GENERAL PERFORMANCE

① Power requirement	+5 V ⎓ 2.7 A max
② Dimensions (W x H x D)	101.6 x 25.4 x 150 mm (exclude Front Bezel)
③ Weight	475 g typ.

6.4 ENVIRONMENTAL CONDITIONS

	Operating	Non-operating
• Temperature	5 ~ 45 °C	–30 ~ 60 °C
• Humidity	20 ~ 80 %Rh	5 ~ 90 %Rh
• Max. wet bulb temp.	29 °C (Non-condensation)	29 °C (Non-condensation)

6.5 PICK UP LASER

• Type	Semiconductor laser GaAlAs
• Wave Length	795 ± 20 nm
• Divergence	θ_V = 30° ~ 36°
• Output power	3.6 mW

CHAPTER 7 BEFORE REQUESTING SERVICE

7.1 TROUBLESHOOTING

(1) There are many kinds of problems caused by misuses. When a problem occurs, check the table below which describes possible problems occurring with your SuperDisk drive.

(2) If the SuperDisk drive does not operate correctly and you cannot restore operation by the following detailed procedures in the table, do not remove the cover of the units or adjust further.

(3) In the case of (2) above, unplug the unit and consult with your dealer or the nearest service station.

TROUBLE	CORRECTION
• SuperDisk drive does not operate and Busy Indicator does not light.	① Ensure that the connection between the SuperDisk drive and the host computer is correct. ② Ensure that the Device Driver installation has been completed. ③ Ensure that the setting drive select switch is correct. ④ Ensure that the disk has been inserted label side up and shutter side head. ⑤ Ensure that foreign objects are not inserted.

APPENDIX

Installation of the SuperDisk Device Driver for Windows 95 / 98

(When you operate the SuperDisk drive under Windows 95 version(Retail, OSR1), install the Device Driver according to the below instruction.)

The SuperDisk drive must be installed into your host computer before installing this device driver.

1. Turn on the personal computer and start Windows 95.
2. Set the SuperDisk driver disk for Windows 95/98 in the your drive(FD drive).
3. Open the **Run...** window from the **Start** menu.
4. Type "A:\SETUP.EXE" and press **OK**. (assumes that your drive is designed "A")
5. Follow the procedures displayed on the screen to install SuperDisk Device Driver.

Installation of the SuperDisk Device Driver for DOS/ Windows 3.1

The SuperDisk drive must be installed into your host computer, before installing this device driver.

1. Turn the power of your personal computer on. If your system automatically loads Windows, you must exit Windows and reach the DOS prompt C:\ .
   This explanation assumes that your floppy drive is designed "A" and your hard disk drive "C".
   If, however, you have used other letters to designate your drives, please substitute another appropriate letter.

2. Set the SuperDisk driver disk for DOS/ Windows 3.1 in the your drive(FD drive).

3. Type **A:** and press <Enter>.
   The current drive changes to "A".

4. Type **INSTALL** and press <Enter>.

5. Type " 2 " and press <Enter> for selection of Installation menu.

   The program data will then be transferred, and the CONFIG.SYS, and AUTOEXEC.BAT, etc. will be changed.
   Note: If you wish to designate the drive / directory where to install, select "1" of Installation menu.

   The completion message appears, and reach the DOS prompt.

6. Eject the driver disk from the your drive.
   After the installation, store this disk in a safe place for future use.

7. To restart the system, press the reset button on your personal computer, or the following keys:

   Ctrl + Alt + Delete

   Check that the device driver of this device has been installed during the start-up procedure.
   Every time DOS is started, the device driver of this device will be automatically installed.

Installation of the SuperDisk Device Driver and Format Utility for Windows NT4.0

(When you need to format a 2HD/2DD disk under Windows NT4.0(SP3), install the Device Driver and Format Utility according to the below instruction.)

The SuperDisk drive must be installed into your host computer before installing these softwares.

1. Turn on the your computer and start Windows NT4.0.
2. Open "SCSI Adapters" icon on "Control Panel" window.
3. Select tab "Drivers" and press "Add" button.
4. Press "Have Disk..." button.
   "Install From Disk" window appears.
5. Set the SuperDisk driver disk for NT4.0 in the your drive(FD drive) and press "OK" button.
   "Install Driver" window appears.
6. Press "OK" button.
   "Windows NT Setup" window appears.
7. Type "A:\" and press "Continue" button. (assumes that your drive is designed "A")
8. Eject the driver disk when the software installation is complete.
   "System Settings Change" window appears.
9. Press "Yes" button.
   The your computer is rebooted.

– Next, install the Format Utility as follows;

10. Set the SuperDisk driver disk for NT4.0 again in the your drive.
11. Open "Run..." window from "Start" menu.
12. Type "A:\SETUP.EXE" and press "OK" button.
13. Follow the procedures on the screen.

Installation of the SuperDisk Device Driver and Format Utility for Windows NT3.51

(You need not to install the following software under Windows NT3.51(SP5).)

The SuperDisk drive must be installed into your host computer before installing these softwares.

1. Turn on the your computer and start Windows NT3.51.
2. Open "Main" on "Program Manager" window.
3. Open "Windows NT Setup" icon.
4. Select "Add/ Remove Windows Components" from "Options" menu.
5. Press "Add" button on "SCSI Adapter Setup" window.
6. Press "OK" button on "Setup Message" window.
7. Select "Other" on "Select SCSI Adapter Option" window.
   "Insert Disk" window opens.
8. Set the SuperDisk driver disk for NT3.51 in the your drive(FD drive) and press "OK" button.
9. Press "OK" button on "Select OEM Option" window.
10. Press "Install" button on "Select SCSI Adapter Option" window.
11. Follow the procedures on the screen.
12. Eject the driver disk when the software installation is complete.
13. Press "Close" button on "SCSI Adapter Setup" window.
14. Select "Exit" from "Options" menu on "Windows NT Setup" window.
15. Reboot the your computer.

– Next, install the Format Utility as follows;

16. Set the SuperDisk driver disk for NT3.51 again in the your drive(FD drive).
17. Double-click "Setup.exe" icon on "File Manager".
18. Follow the procedures on the screen.
19. Eject the driver disk when the software installation is complete.

Formatting of SuperDisk / 2DD or 2HD disk

for Windows 95 / 98 / NT4.0

(You can also use the Formater attached with Windows 95(OSR2.x), Windows 98 or Windows NT4.0 .)

1. Insert a disk that you wish to format into the SuperDisk drive.
2. Right-click on the " Removable Disk " or " 3 1/2 Floppy " (Windows 95(OSR2.x) / Windows 98 / Windows NT4.0) icon.
3. Left-click on the " Format utility For SuperDisk ".
4. " Format Utility for SuperDisk " window appears.
   Follow the procedures displayed on the screen to perform formatting of disk.

for DOS / Windows 3.1

If your system is under Windows 3.1, reach the DOS prompt C:\.
(assumes that your SuperDisk drive is designed "D" and your hard disk drive "C".)

1. Insert a disk that you wish to format into the SuperDisk drive.
2. When formatting a 2DD or 2HD diskette, perform Standard formatting.
   When formatting a SuperDisk disk, type " FORMAT␣D: " and press <Enter>.

   *␣ = one space

for Windows NT3.51

1. Open "Format Utility for SuperDisk" on "Program Manager" window.
2. Open "SuperDisk Format Utility" icon.
3. Follow the procedures on the screen.

Note : Low-level formatting for SuperDisk disk is not supported.